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PLASMA FOCUS SYSTEM; DESIGN, CONSTRUCTION AND EXPERIMENTS

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ABSTRACT

The aim of this work is to construct a compact experimental system for fusion research. The design, construction and experiments of the 3 kJ Mather type plasma focus machine is described. This machine is established for neutron yield and fast neutron radiography by D-D reaction which is given by $D + D \rightarrow {}^3\text{He} (0.82 \text{ MeV}) + n (2.45 \text{ MeV})$. Investigation of the geometry of plasma focus machine in the presence of high voltage drive and vacuum system setup is shown. 10^8 neutron per pulse and 200 kA peak current is obtained for many shots. Scintillator screen for fast neutron imaging, sensitive to 2.45 MeV neutrons, is also manufactured in our labs. Structural neutron shielding computations for safety is also completed.

Keywords: Plasma focus, neutron, D-D reaction, fusion research